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ABSTRACT

A Chicago suburban public school with approximately 450 children per grade level demonstrated a system-wide program for identification, diagnosis, and educational treatment of children with learning disabilities in grades 2 through 6. Children were judged to underachieve when achievement measures in language or mathematics fell more than 10% below the expected level based on age, IQ, and grade placement. During the 3 year project, a screening program was developed and employed with 2,300 children. A novel remedial program was carried out for 156 children. Specialists in learning disabilities refined the screening diagnosis and developed teaching prescriptions for all students. Much of the teaching was carried out by teachers with minimal special training. The procedures developed may be especially useful to districts initiating a learning disabilities program or one which is handicapped by lack of specially trained teachers. The report contains program description, measures of student performance, tables on incidence and types of learning disabilities, and suggestions for implementing a program. (Author/RJ)

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FINAL REPORT
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A DEMONSTRATION OF TECHNIQUES IN THE IDENTIFICATION, DIAGNOSIS, AND TREATMENT OF CHILDREN WITH LEARNING DISABILITIES

September 1969

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Bureau of Research

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We also wish to acknowledge the assistance of Dr. Naomi Zigmond, Dr. James Chalfant, and Dr. Douglas Wiseman, who acted as our consultants.

SUMMARY

This is a report of a three-year project conducted by School District 68, Skokie, Illinois. The project was designed to develop and demonstrate a comprehensive school program for the identification, diagnosis, and treatment of children with learning disabilities. The project involved the screening of 2300 children from grades two through six in a middle class, suburban public school system.

The identification phase of the program consisted of two screens: one involving group tests and one utilizing an individual intelligence test. The screens ruled out mental retardation, sensory deprivation, and serious primary emotional disturbance as causes of learning disability, and isolated significant underachievers by objective criteria. The identification program was evaluated and found to be efficient and effective. The program identified about 9.8 per cent of the population as having mild to severe learning disabilities. Types of disabilities are reported.

In the diagnostic phase of the program, children with learning disabilities were tested individually to pinpoint deficiencies and assets. The program field tested the use of the diagnostic-teacher, a specialist trained in the field of learning disability, to bridge the gap between identification and treatment. The diagnostic-teacher conducted this phase of the program and prepared individual educational prescriptions to be implemented by other teachers.

All children with learning disabilities received part-time remedial treatment based upon educational prescriptions. Treatment was evaluated statistically and found to be effective in producing significant gains in academic achievement for children with reading problems who constituted 60 per cent to 95 per cent of the groups identified.

The remedial program utilized some teachers with no formal training in learning disorders and some trained personnel. Data suggest that the unspecialized teachers

taught effectively when provided with educational prescriptions and inservice education.

This report contains a cost analysis of the entire program based on man-hours of input. Procedures and recommendations for each phase of the program are outlined for use by other school districts.

CHAPTER I

INTRODUCTION

Background. During the past ten years children with learning disabilities (LD) have been identified as handicapped youngsters who require specialized educational programs. They generally fail to learn normally and underachieve academically in terms of their intelligence. They are not primarily emotionally disturbed, sensorily impaired, or mentally retarded. The learning disability is not primarily due to motor dysfunction or lack of opportunity to learn. Learning disability is behaviorally determined as a disturbance of the learning processes of perception, cognition, or expression.

At present it is estimated that children with LD constitute a minimum of 5 per cent of the school population. They require specialized diagnosis and remedial treatment. To meet the educational needs of these youngsters the development of LD programs in the public schools is imperative. These programs must identify the youngsters who are seldom recognized as handicapped and provide for their treatment.

Several years ago there were few public school services of children with LD and no large-scale LD programs. School systems desiring to initiate programs had no model. Lack of trained personnel, poorly defined criteria for LD, confusing terminology, and the high cost of special education programs were additional problems for the schools to resolve. In 1964 and 1965 School District 68 in Skokie, Illinois conducted a pilot program. This program resulted in the identification of 7 per cent of the children in one elementary school as having LD and led to formulation of this project.

Purpose of the Project. The purpose of this three-year research project was to develop and demonstrate a viable public school program for identification, diagnosis, and treatment of children with LD in the public schools. Known procedures for diagnosis and instruction employed by Northwestern University, the University of Illinois, and the University of Wisconsin were to be adapted to the school setting.

Pursuant to the overall goal of demonstrating a comprehensive LD program, several more specific objections emerged. First, in order to provide for systematic and effective identification of LD children, the project would utilize and refine a large scale screening program based upon use of intelligence and achievement tests and objective criteria. The identification program was to be evaluated for its efficiency, effectiveness, and cost.

The second objective was to field test the use of a diagnostic-teacher to bridge the gap between diagnosis and educational treatment by designing educational prescriptions to be implemented by other personnel. Traditionally, the child identified by psychological examination was assigned to a special tutor who relied upon trial and error to locate the specific deficits of the child and most appropriate teaching procedures for him. Few teachers had sufficient training to test and diagnose. It was theorized that the diagnostic-teacher with specialized LD training would be most efficiently employed to aid the greatest number of children if she performed these functions and prescribed an educational program for each child.

The third specific objective was to demonstrate effective adaptations of clinical teaching procedures in the public school setting. The effectiveness of treatment was to be statistically evaluated and the cost of the remedial program ascertained.

CHAPTER II

METHODS AND PROCEDURES

Population and Sample

School District 68, Skokie, Illinois, is one of several school districts in a northern suburb of Chicago. The student population is predominantly white representing a middle class community. The district has approximately 4000 students from kindergarten through eighth grade. The subjects of this study were 2300 children enrolled from grades one through six in the four elementary school buildings of the district.

Professional Staff

The staff initially consisted of two diagnostic-teachers and a project director who had experience as LD teachers and academic training at the graduate level in the field of LD. The school psychologist was a part time member of the project staff. A third diagnostic-teacher was added to the staff during the third year of the project.

As children with LD were identified by the project remedial teachers were added to the staff. For the first two years of the project five teachers were employed: three had no teaching experience at all and no academic training in the area of LD; two had classroom teaching experience and one or two courses in special education; and one was a trained LD teacher with no teaching experience. It was planned that the project would demonstrate methods of overcoming the shortage of trained LD people by utilizing classroom teachers and developing an in-service training program.

By the third year of the program the supply of special LD teachers had significantly increased in the north suburban area of Chicago, and it was no longer expedient to employ unspecialized personnel. Two of the original five teachers remained and attained minimal state approval as LD teachers by completing five special academic courses beyond those required for classroom teaching.

Seven LD teachers who met these requirements were added to the staff. Only two of these had experience in teaching LD children.

Identification of LD Cases

A comprehensive LD program was planned to consist of three phases: 1) identification of children with learning disabilities from a screening-testing program and from teacher referrals, 2) diagnosis of individual learning problems and preparation of educational prescriptions, and 3) individualized educational treatment for children with LD. (Figure 1 illustrates the three phases of the program.) One grade level at a time was systematically screened to identify children with LD so that at the conclusion of the study all of the children from grades two through six were screened. During the first year grades three and four were screened, the second year grades two and three, and the third year grade two.

Screen One. The identification phase of the learning disabilities program consisted of two testing screens. Screen one was a broad screen designed to isolate a population of suspected underachievers by use of group tests. Children with LD are children who are unable to actualize their overall intellectual potential in learning a variety of things; they characteristically underachieve. Those who underachieve in academic skills are of primary concern to the public schools. In designing a screen to identify underachievers, we attempted to identify a population which included learning disability cases. If effective and efficient, a group screening device would provide a means for systematic isolation of LD children.

In screen one the Otis Quick Mental Ability Test, Alpha Form, and the Stanford Achievement Tests (SAT) were administered to all children at a given grade level in their classrooms. A screening list was compiled of those children underachieving in terms of their own ability according to selected criteria. These children were scheduled for further testing. Criteria for underachievement are discussed in Chapter IV.

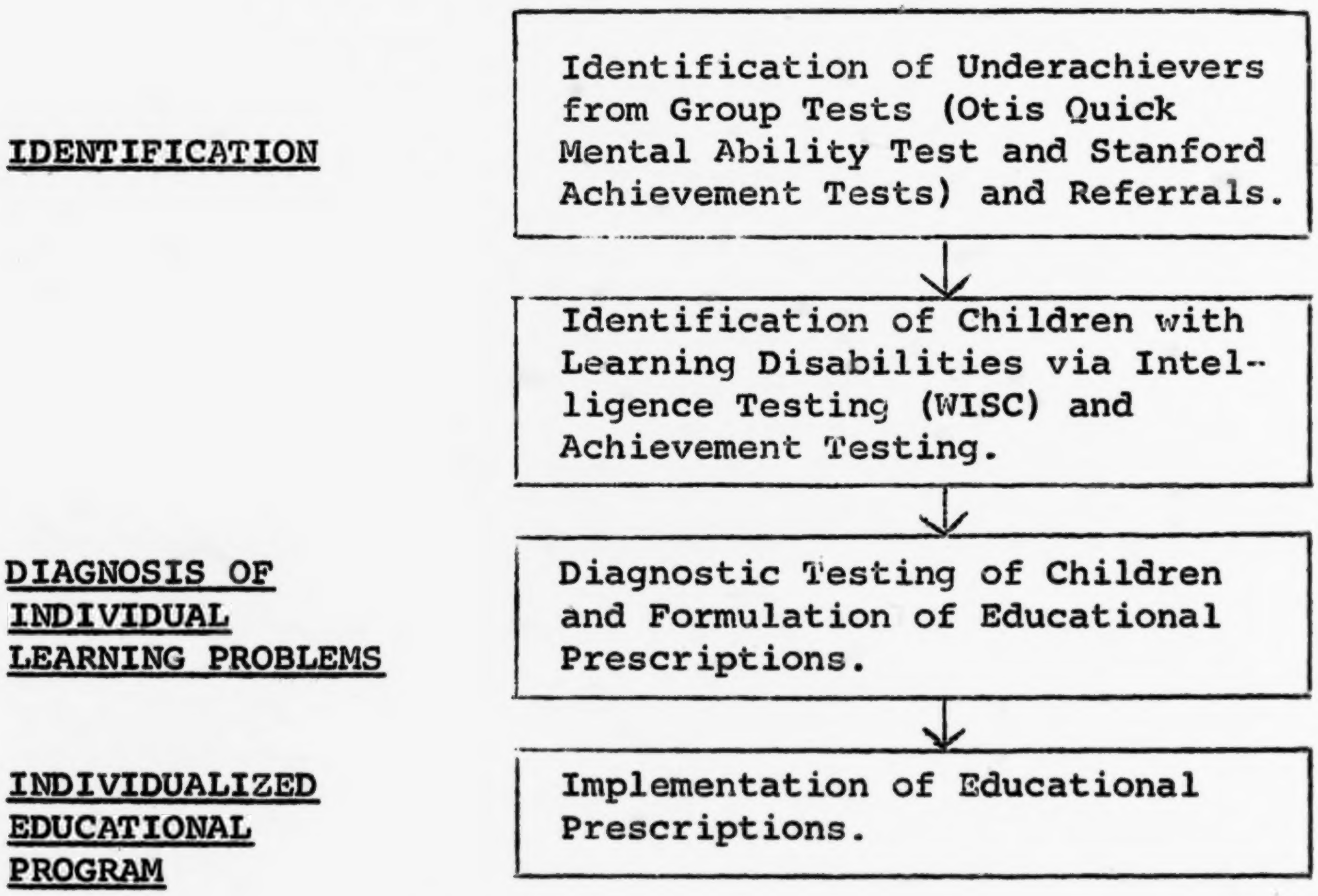
IDENTIFICATION
Identification of Underachievers from Group Tests (Otis Quick Mental Ability Test and Stanford Achievement Tests) and Referrals.
Identification of Children with Learning Disabilities via Intelligence Testing (WISC) and Achievement Testing.
DIAGNOSIS OF INDIVIDUAL LEARNING PROBLEMS
Diagnostic Testing of Children and Formulation of Educational Prescriptions.
INDIVIDUALIZED EDUCATIONAL PROGRAM
Implementation of Educational Prescriptions.

Figure 1

PROGRAM FOR IDENTIFICATION AND TREATMENT OF CHILDREN WITH LEARNING DISABILITIES IN SKOKIE SCHOOL DISTRICT 68

Children with visual acuity less than 20/40 in best eye with best correction, or more than 25Db. loss of auditory acuity in best ear were referred to outside specialists for examination and treatment. These youngsters were temporarily eliminated from the screening program because of the probability that problems of auditory or visual acuity were responsible for underachievement. Thus, screen one isolated suspected under achievers and ruled out sensory deprivation as the etiology of learning disability.

For the first three grade levels screened classroom teachers were asked to nominate students whom they believed had learning difficulties but who were not on the screening list. During the screening of the last two grade levels, classroom teachers were asked to nominate all students whom they thought had LD. They were not told which children had been scheduled for additional testing.

Questionnaires were sent to the school nurses, social workers, speech correctionists, and special service personnel to collect data on the children from the screening list. Pupil behavior checklists were sent to classroom teachers. (See Appendix, Item 1) Diagnostic teachers studied the data for planning diagnostic procedures and for later preparation of educational prescriptions.

Screen Two. Screen two was designed to provide a reliable estimate of intelligence and to ascertain the existence of underachievement for the children isolated by screen one. This screen utilized individual intelligence tests and a second battery of achievement tests. Youngsters with a WISC IQ score of 80 or less were studied individually and screened out if mental retardation was judged to be the primary cause of LD. Other special facilities were to be considered for the retarded. The school psychologist administered the WISC. Diagnostic-teachers administered the Metropolitan Achievement Tests (MAT), the Gates-MacGinitie Reading Tests, and the Picture Story Language Test.

There is no consensus in the literature regarding the exact level of achievement which we may expect from a child. Some educators and psychologists believe that expected achievement should be directly related to intelligence or mental age as measured by intelligence tests. Others are of the opinion that mental age alone does not predict achievement and that maturational factors such as chronological age and physical maturity affect a child's achievement. Still others feel that environmental factors, particularly the grade placement and curriculum to which a child is exposed, must be considered in setting achievement standards.

A formula used by the Institute for Language Disorders, Northwestern University, was utilized in this project. Part one of the formula determined expected achievement age (EA) by taking into consideration the mental age (MA), chronological age (CA) and grade age (GA) and averaging them:

$$\frac{MA + CA + GA}{3} = EA$$

In this formula the mental age was derived from the highest IQ score on the Verbal or Performance subtests of the WISC rather than from the Full Scale score. The rationale was that many children with LD manifest wide discrepancies in Verbal and Performance IQ scores. It was theorized that the highest IQ score represents a child's truest potential ability and is a more reliable basis for determining expected achievement than the Full Score IQ score.

Part two of the formula (somewhat modified) related the child's actual achievement age (AA) obtained from achievement test scores to the child's expected achievement age in terms of an educational quotient (EQ):

$$\frac{AA}{EA} \times 100 = EQ$$

The criterion for underachievement in the project was an EQ of 89 or less in reading, arithmetic, or written language as represented by achievement test performance.

The identification program defined LD in terms of significant underachievement when mental retardation, sensory impairment, motor dysfunction, and cultural or educational deprivation were ruled out as etiological factors. Cultural deprivation was judged minimal in this population. Although it was deemed desirable at the inception of this project to screen out children with learning problems having an etiology of emotional disturbance, this approach did not prove feasible in a public school screening program. First, no simple test or procedure suitable to a district-wide testing program could be found to establish emotional disturbance when learning disabilities, particularly in language, were present. Second, the discrimination between an organic and emotional etiology is often a difficult one for diagnostic-specialists even in clinical situations. Medical data are not always definitive. Emotional overlay is a common phenomenon in cases of organically caused learning disability. It is frequently difficult to determine whether emotional disturbance is the cause or effect of the disability.

Children who were seriously underachieving, whose school records suggested no severe emotional disturbance, and whose behavior was such that they appeared able to profit from special educational treatment, were retained in the LD program. There are indications in the literature that the structured educational treatment used with cases of LD is also effective with some children whose learning problems stem from emotional etiology. If after a period of time, a child's behavior suggested serious emotional disturbance, and he failed to profit from the remedial program, he was referred for other types of special service. Some students who were in the LD remedial program were concurrently receiving counseling.

Diagnosis and Preparation of Educational Prescriptions

In the second phase of the program children identified as having LD received individual diagnostic testing conducted by diagnostic-teachers. Among the tests administered were the Illinois Test of Psycholinguistic Abilities, the Peabody Picture Vocabulary Test, the Gates-McKillop Reading Diagnostic Test, The Gray Oral Reading Test, Wepman Auditory Discrimination Test, Metropolitan

Achievement Tests, Frostig Test of Visual Perception, Bender Visuo-Motor Gestalt Test, and portions of the Detroit Tests of Learning Aptitude. Data from the WISC, Picture Story Language Test, and Gates-MacGinitie Reading Tests administered during the screening program were also available. In many cases testing was followed by brief periods of diagnostic-teaching.

The tests furnished data for evaluation of intellectual potential, verbal and non-verbal skills, perception, memory, auditory receptive and expressive language, reading skills (word-attack, comprehension, integration of auditory and verbal symbols), spelling, written language, mathematical computation and reasoning, space and time orientation.

The emphasis in this phase of the program was placed upon remedial diagnosis: a diagnosis which pinpoints individual deficits and assets and leads to formulation of specific teaching prescriptions. Diagnostic-teachers assembled all data accumulated about each pupil, and made a tentative diagnosis of each child's problem. They prepared individual educational prescriptions which specified the academic skills requiring remediation, language disorders present, the learning processes impaired, and teaching procedures recommended. Once remediation was initiated the diagnostic teacher received weekly feedback regarding the accuracy of the diagnosis and effectiveness of treatment.

When the diagnosis was completed for a given child, the diagnostic-teacher held a conference with the child's parents. A conference was also held with the regular classroom teacher and staff to share results of testing and to discuss appropriate modifications of the school program.

In this phase of the program the project aimed to utilize talents of the trained diagnostic-teachers most effectively to aid many children and to bridge the traditional gap between diagnosis and education of the LD child. Although the identification of an LD child was based upon objective criteria, diagnosis and educational prescription was based upon the experience and professional judgment of diagnostic-teachers.

Educational Treatment: Prescriptive Teaching

The ultimate goal of the remedial program was to meet the educational needs of the child with LD so that he might achieve at a level commensurate with ability. Educational prescriptions were executed by LD teachers under the supervision of diagnostic-teachers. Teachers met every other week to evaluate progress and make necessary changes in diagnosis and remediation. Parent conferences were held twice a year. Informal conferences among LD teachers, classroom teachers, and social workers were ongoing.

LD teachers had an average weekly caseload of twenty-two pupils ranging from severe to mild learning disability cases. Pupils received remedial treatment in small groups of two to six students. The average group size was three students. Children remained in the regular classroom for most of the school period and worked with the LD teacher from one to five times per week according to severity of underachievement. The average length of a remedial period was 45 minutes. Some children with behavior difficulties were seen individually when special service was initiated, but they were assimilated into groups as soon as feasible.

Children were assigned to groups with youngsters who had common subjects of underachievement, who were approximately at the same level of achievement, who had common disabilities, and who needed similar teaching procedures. Children belonged to different groups for remediation in different skills.

During the first two years of the project, LD teachers with little or no academic preparation in the field of learning disabilities participated for two hours weekly in inservice meetings with the entire staff. The program included films, speakers, demonstrations, and study of a text, Learning Disabilities, by Doris Johnson and Helmer Myklebust. (A list of inservice resources may be found in the Appendix.)

Specific teaching techniques were those used successfully in clinics for a number of years. New techniques unsupported by adequate research were not employed. No gross motor training was included in the remedial program. Some of the major principles of remediation may be summarized as follows:

1. Utilization of techniques to develop rapport, good social adjustment, and mental health. For example, showing respect for the child, helping him to develop self-understanding and self-esteem, providing him with successful learning experiences, and showing him acceptable ways of behavior.

2. Remedial teaching in academic subjects of underachievement by methods appropriate to the child's needs.

3. Initial teaching via the sensory modality by which the child learns most effectively, followed by

4. Development of less intact sensory modalities by simultaneous teaching to intact and disabled modalities.

5. Development of deficient cognitive and psycholinguistic skills by specific exercises.

6. Utilization of structure in the systematic presentation of concepts and tasks to be learned and structure of the learning environment to minimize distraction and aid development of attention.

A variety of methods and materials was used to meet individual needs. Reading methods included phonic, linquistic, and whole-word methods. (Items 3 and 4 in the Appendix contain a list of typical materials used by remedial teachers for development of skills and also some examples of exercises to develop specific learning processes.)

Children in the program were retested after 7 to 10 months of remediation. Those with educational quotients of 90 or above in the original subjects of underachievement were dismissed from the program.

CHAPTER III

EFFECTIVENESS OF EDUCATIONAL TREATMENT

The effectiveness of educational treatment was evaluated in terms of educational objectives. The major objective was to provide treatment to raise the LD child's level of academic achievement to correspond closely to the level of estimated intellectual potential. The evaluation was viewed from two perspectives: 1) the statistical statements as to whether or not educational objectives were met and 2) the percentage of children whose achievement improved and who were dismissed from the remedial program. No attempt was made to set up experimental procedures to ascertain the comparative effectiveness of various treatments. No control groups were used. Once children were identified as LD cases, it was felt that the public school system was obligated to perform educational treatment for all of the LD children for a trial period on the basis of previous success of treatment in clinics and universities.

Four groups of LD children (A,B,C,D) identified at different times and receiving treatment for four different periods of time were used in this study. Pretest and posttest procedures were essentially the same for all groups. For posttesting appropriate forms of the tests used in screen two of the identification program were used: The Gates-MacGinitie Reading Tests for Paragraph Meaning and Word Meaning, the Picture Story Language Test (PSLT), and the Metropolitan Achievement Tests (MAT) for Arithmetic Computation and Reasoning, and Spelling. Achievement scores were recorded in terms of grade levels, and also converted into educational quotients (EQ) for each child in each academic subject of underachievement.

Unfortunately, the time period of exposure to remedial treatment could not be the same for each group of pupils. The period of educational treatment varied from eight to ten months among the groups. In addition, the number of months that the child actually received special remedial assistance was the time period used in the evaluation.

Statistical Analysis: GROUP A

Thirty-six children in Group A were identified as LD cases during fourth grade. They entered the remedial program on a part-time basis in grade four and were retested after 10 months of special remedial treatment while in fifth grade (April 1968).

Academic gains in terms of grade level scores were evaluated for each subject area separately because some students were being helped in several subject areas, while others were being helped in only one. This fact prohibited the use of multi-factor design.

The academic objective for each subject area was as follows: that the group in question would have shown an academic gain greater than the length of time in treatment (months) times the average educational quotient (EQ) of that group. The t-test for correlated or dependent samples was the statistical procedure used to test for the objective in each case. The null hypothesis tested in each subject area was that the group would _not_ show a gain greater than time of treatment times average EQ.

Table I gives a summary of data for Paragraph Meaning. The academic objective of a gain in achievement greater than 8.33 months was met for Paragraph Meaning. The null hypothesis was rejected.

TABLE I

DATA RELATED TO ACHIEVEMENT
GAINS IN PARAGRAPH MEANING.
GROUP A

	PRE	POST
N	22	22
$\bar{X}_{GE}$	2.74	4.45
t	2.08 (21 df, $p < .025$)	

Table II gives similar data for Word Meaning. The academic objective of more than 8.30 months gain was met, and the null hypothesis was rejected.

TABLE II

DATA RELATED TO ACHIEVEMENT GAINS IN WORD MEANING. GROUP A

	PRE	POST
N	11	11
$\overline{X}$ GE	2.84	4.28
t	2.09 (10 df. $p < .05$)	

Table III gives similar data for written language on the PSLT. The objective of more than 8.45 months gain was met, and the null hypothesis was rejected.

TABLE III

DATA RELATED TO WRITTEN LANGUAGE ACHIEVEMENT GAINS. GROUP A

	PRE	POST
N	15	15
$\overline{X}$ GE	3.17	4.76
t	1.96 (14 df. $p < .05$)	

Table IV gives data relevant to Arithmetic Computation. The null hypothesis could not be rejected. Gains were not significantly greater than 8.58 months.

TABLE IV

DATA RELATED TO ACHIEVEMENT GAINS
IN ARITHMETIC COMPUTATION.
GROUP A

	PRE	POST
N	10	10
$\overline{X}$ GE	3.37	4.69
t	1.41 (9 df, NS)	

Table V gives data relevant to gains in Arithmetic Reasoning. The null hypothesis could not be rejected; gains did not exceed more than 8.64 months.

TABLE V

DATA RELATED TO ACHIEVEMENT GAINS
IN ARITHMETIC REASONING.
GROUP A

	PRE	POST
N	8	8
$\overline{X}$ GE	3.11	4.11
	.517 (7 df, NS)	

Table VI gives some data for Spelling. The null hypothesis could not be rejected; gains were not significantly greater than 8.28 months.

TABLE VI

DATA RELATED TO ACHIEVEMENT GAINS IN SPELLING

	PRE	POST
N	8	8
$\overline{X}$ GE	2.81	4.32
t	1.23 (7 df, NS)	

Gains in average educational quotient were also assessed. Table VII gives data relevant to all tests performed in this connection; in each case, the objective tested was that the change was positive and statistically significant. In every subject area except Arithmetic Reasoning there was a gain evidenced in educational quotients. In no case, however, was the change statistically significant. Therefore, the objective that a significant gain be shown in educational quotients was not achieved.

TABLE VII

TESTS ASSOCIATED WITH GAINS IN EDUCATIONAL QUOTIENTS. GROUP A.

SUBJECT	STATISTICAL	PRE	POST
Paragraph Meaning	N	22	22
	$\overline{X}$	83.27	86.54
	t	1.105 (21 df, NS)	
Word Meaning	N	11	11
	$\overline{X}$	83.04	86.36
	t	1.64 (10 df, NS)	
Written Language (PSLT)	N	15	15
	$\overline{X}$	84.47	89.47
	t	1.30 (14 df, NS)	
Arithmetic Computation	N	10	10
	$\overline{X}$	85.75	88.4
	t	1.29 (9 df, NS)	
Arithmetic Reasoning	N	8	8
	$\overline{X}$	86.38	84.50
	t	- 1.22 (7 df NS)	
Spelling	N	8	8
	$\overline{X}$	82.75	86.38
	t	1.25 (7 df, NS)	

Changes in the average educational quotients (pre and post) for children in each of the four elementary school buildings were assessed and compared. See Tables VIII and IX. Significant gains in academic quotients were made in buildings A, C, and D. School B showed a loss in quotient. The quotients among the buildings were significantly different.

TABLE VIII

ADJUSTED MEANS IN FOUR SCHOOLS

	BUILDING			
STATISTIC	A	B	C	D
N	11	8	11	6
Pretest Ave. Quotient	85.03	82.98	84.14	85.78
Posttest Ave. Quotient	94.27	78.79	91.98	92.38
Adj. Posttest Ave.	94.06	79.30	92.07	91.90

TABLE IX

ANALYSIS OF COVARIANCE

Source	df	MS	F	P
Buildings	3	357.77	3.45	.05
Error	32	103.56		

Children with LD were diagnosed and classified by sensory modalities through which defective information processing and learning were occurring. An attempt was made to analyze academic gains by diagnostic condition. The small number of subjects per cell made this approach impossible with a subject area by diagnostic category analysis, except for Paragraph Meaning and Word Meaning. Table X summarizes the analysis of covariance performed on Paragraph Meaning scores for subjects with visual deficiencies, and auditory problems. There were no significant differences among the diagnostic groups.

TABLE X

ANACOVA ON PARAGRAPH MEANING SCORES
FOR THREE DIAGNOSTIC GROUPS

Source	df	MS	F	P
Groups	2	1.74	.447	NS
Error	18	3.89	--	

Table XI gives a summary of the analysis of convariance done on Word Meaning Scores.

TABLE XI

ANACOVA ON WORD MEANING SCORES
FOR TWO DIAGNOSTIC GROUPS

Source	df	MS	F	P
Groups	1	3.43	11.83	.01
Error	8	.27		

In this case, one group was composed of students with either visual or auditory problems, while the other group contained students with both. Table XII shows adjusted means for the two groups.

TABLE XII

ADJUSTED MEANS FOR POSTTEST WORD MEANING SCORES
FOR TWO DIAGNOSTIC GROUPS

	GROUP	
STATISTIC	EITHER	BOTH
N	4	7
Act. G.E. Ave.	5.05	3.84
Adj. G.E. Ave.	4.96	3.89

Students with either visual or auditory problems scored significantly higher on Word Meaning than did students with both problems.

An overall comparison of gain by diagnostic area was done by using educational quotients, pre and post. In cases where a student was involved in more than one subject area, his quotients were averaged. The results of this analysis are shown on Table XIII. There were no significant group differences.

TABLE XIII

ANACOVA ON ACHIEVEMENT QUOTIENTS
FOR THREE DIAGNOSTIC GROUPS

Source	df	MS	F	P
Groups	2	18.86	.157	NS
Error	3715.23	119.85		

Data from the statistical analysis suggest that children in Group A made significant gains in terms of achievement grade scores in Paragraph Meaning, Word Meaning, and Written Language following ten months of special educational treatment. Although gains were made in Arithmetic Computation, Arithmetic Reasoning, and Spelling, they were not statistically significant.

Analysis of academic gains in Paragraph Meaning by diagnostic categories (auditory problems, visual problems, and combined auditory and visual problems) revealed no significant differences in gains among the diagnostic groups. Analysis of gains in Word Meaning showed that children with deficiencies in one sensory modality scored significantly higher than those with impairment in two modalities. However, because of the small number of pupils in each diagnostic category, no generalizations or conclusions are indicated.

When the average educational quotients for Group A pretest and posttest were compared in each subject, no statistically significant gains were noted. However, analysis of gains according to the four elementary school buildings revealed that statistically significant gains were made in three buildings. A loss in the average quotient for one building obscured the gains in others.

Data from the evaluation of educational treatment for Group A suggest that treatment was effective in raising the academic achievement levels of LD children in Reading and Written Language. Since 60 per cent of the group were disabled in reading at the onset of remediation, the practical effectiveness of treatment was apparent. Further evidence of effective treatment was indicated by the dismissal of one-third of the children from the program because all EQ's were ninety or above.

Statistical Analysis: GROUP B

Children in Group B were pretested and identified as LD cases during the final months of third grade. They entered the remedial program at the beginning of grade four and were retested in May, 1968 after eight months of remedial intervention. The analysis for Group B followed the same procedure used for Group A. As a first step, achievement gains in terms of grade scores of the target children were assessed subject area by subject area. The academic objective for each subject area was identical with Group A: the group in question should show an academic gain in grade scores greater than the average length of time in treatment (eight months) times the average educational quotient for that group. Due to technical difficulties,gains in Arithmetic Computation could not be assessed.

Table XIV gives data for Paragraph Meaning. The academic objective of a gain in achievement greater than .805 times 8 months, or 6.45 months was met ($p < .001$) for this subject area.

TABLE XIV

DATA RELATED TO ACHIEVEMENT GAINS IN PARAGRAPH MEANING GROUP B

	PRE	POST
X	28	28
$\bar{X}$ GE	2.24	3.73
t=	5.99 (27 df, $p < .001$)	

Table XV presents similar data for Word Meaning. In this case the academic objective was that the gain in Word Meaning scores should be greater than .852 times 8 months, or 6.81 months. This objective was met ($p < .001$).

TABLE XV

DATA RELATED TO ACHIEVEMENT GAINS IN WORD MEANING GROUP B

	PRE	POST
N	14	14
$\bar{X}$ GE	2.65	4.41
t	5.57 (13 df, $p < .001$)	

Table XVI gives data for the Picture Story Language Test (PSLT). The academic objective was that the academic gain should be greater than .861 times 8 months, or 6.89 months. This objective was met ($p < .025$).

TABLE XVI

DATA RELATED TO ACHIEVEMENT GAINS IN THE PSLT GROUP B

	PRE	POST
N	20	20
$\overline{X}$ GE	2.80	4.32
t	2.51 (19 df, $p < .025$)	

Table XVII gives data for Arithmetic Reasoning. The objective to be tested was that gain be greater than .857 times 8 months, or 6.86 months. This objective was met ($p < .001$)

TABLE XVII

DATA RELATED TO ACHIEVEMENT GAINS IN ARITHMETIC REASONING, GROUP B

	PRE	POST
N	16	16
$\overline{X}$ GE	2.71	3.64
t	5.00 (15 df, $p < .001$)	

Table XVIII gives data for Spelling. The objective for Spelling was that gain should be greater than .828 times 8 months, or 6.62 months. This objective was also met.

TABLE XVIII

DATA RELATED TO ACHIEVEMENT GAINS IN SPELLING
GROUP B

	PRE	POST
N	9	9
$\overline{X}$		
GE	2.68	4.17
t	3.83 (8 df, $p < .005$)	

Gains in average Educational Quotient, taken subject area by subject area, were also evaluated. Table XIX gives data relevant to this evaluation. In each case, the objective was that the gain should be significant. In all subject areas, except Spelling and Arithmetic Reasoning, this objective was met.

TABLE XIX

TESTS ASSOCIATED WITH GAINS
IN EDUCATIONAL QUOTIENTS, GROUP B

SUBJECT	STATISTIC	PRE	POST
Paragraph Meaning	N	28	28
	$\overline{X}$	80.5	87.3
	t	4.86 (27 df, $p < .001$)	
Word Meaning	N	14	14
	$\overline{X}$	85.18	93.5
	t	5.15 (13 df, $p < .001$)	
PSLT	N	20	20
	$\overline{X}$	86.1	92.6
	t	2.98 (19 df, $p < .005$)	
ARITHMETIC REASONING	N	16	16
	$\overline{X}$	85.7	88.1
	t	1.58 (15 df, NS)	
SPELLING	N	9	9
	$\overline{X}$	82.8	87.4
	t	2.18 (8 df, NS)	

Academic gains by diagnostic condition were analyzed. Because of the small number of students diagnosed as having either auditory or no perceptual problems, only the visual and visual plus auditory categories could be compared.

Table XX shows gains in average achievement quotient by diagnostic condition. The difference in gains for the two groups was not significant.

TABLE XX

GAINS IN ACHIEVEMENT QUOTIENTS BY DIAGNOSTIC CONDITION

STATISTIC	VISUAL	VISUAL & AUDITORY
N	15	18
Ave. Gain	8.05	6.83
	.58 (31 df, NS)	

Table XXI shows gains in achievement in Paragraph Meaning by visual and visual plus auditory diagnostic categories. The difference in gain between the two groups was not significant.

TABLE XXI

PARAGRAPH MEANING GAINS BY DIAGNOSTIC CATEGORY

	DIAGNOSTIC CATEGORY	
STATISTIC	VISUAL	VISUAL & AUDITORY
N	9	13
Pre $\bar{X}$		
GE	2.27	2.17
Post $\bar{X}$		
GE	4.09	3.62
t	1.12 (20 df, NS)	

Table XXII shows gains in achievement in Word Meaning grade scores for the same two diagnostic categories. The difference in gain between the two groups was not significant.

TABLE XXII

WORD MEANING GAINS BY DIAGNOSTIC CATEGORY

STATISTIC	DIAGNOSTIC CATEGORY VISUAL	BOTH
N	1	4
Pre $\overline{X}_{GE}$	2.58	2.80
Post $\overline{X}_{GE}$	4.60	4.30
	1.15 (7 df, NS)	

Table XXIII shows gains in PSLT grade scores for the two groups. Again, the difference in gain between the two groups failed to reach significance.

TABLE XXIII

PSLT GAINS BY DIAGNOSTIC CATEGORY

STATISTIC	DIAGNOSTIC CATEGORY VISUAL	BOTH
N	6	11
Pre $\overline{X}_{GE}$	2.90	2.76
Post $\overline{X}_{GE}$	4.58	3.81
t	.82 (15 df, NS)	

Table XXIV gives gains in Arithmetic Reasoning grade scores for the two diagnostic categories.

TABLE XXIV

ARITHMETIC REASONING GAINS
BY DIAGNOSTIC CATEGORY

STATISTIC	DIAGNOSTIC CATEGORY	
	VISUAL	BOTH
N	5	9
Pre $\overline{X}_{GE}$	2.80	2.58
Post $\overline{X}_{GE}$	4.32	3.26
t	3.69 (12 df, p .002)	

In this case, the visual category showed significantly greater gain than the combined auditory-visual group. It should be noted that in every comparison made of diagnostic category, the visual group showed more gain than the combined group. This uniformity in the superiority of the visual group suggests strongly that this group responds more readily to the treatments than the children with combined auditory and visual problems applied in this study.

After eight months of remedial treatment, children in Group B made statistically significant gains in Paragraph Meaning and Word Meaning, Spelling, Written Language, and Arithmetic Reasoning. Academic gains in the average EQ for the entire group in reading and written language were significant. Analysis of gains by diagnostic category was inconclusive. Data from the statistical analysis suggest that educational treatment was effective for children in Group B.

Statistical Analysis: GROUP C

Children in Group C were pretested during the middle of third grade and entered the remedial program during the latter part of the school year. Posttesting was done after nine months of remedial treatment during fourth grade (February, 1969).

The criterion for determining effectiveness of treatment for Groups C and D was different from the criterion used for Groups A and B. For the latter groups the criterion was the academic objective that the group would show an academic gain greater than the length of time in treatment times the average EQ of that group. It was theorized that the EQ reflected the differences in intellectual potential of individual children within the group and that this potential was a factor in the academic gain to be expected. Also, the average EQ for the group reflected the degree of underachievement. A group with an average EQ of 75 might be expected to make less progress than a group with an average EQ of 85 because the disabilities are presumed to be more severe.

When we approached the analysis of academic gains for Group C, it was our concern that we might not be expecting enough gain in terms of months as a criterion for effective treatment. The period of time between pretesting and posttesting was greater than the time of actual remediation. For example, in Group C there was a twelve to fifteen month time lapse between testings because of summer vacation and lag in initiating the remediation. The period of remedial treatment was nine months. Some academic gains might have been made during the fifteen month period even without remedial intervention. Without a formal research design utilizing control groups, we could not ascertain how much growth would have occurred. By multiplying the number of months of remediation by the average EQ for the group, we would be lowering the amount of gain expected even below the nine month period. Therefore, it was determined that the EQ would not be used in computing expected gains.

The criterion for effective treatment for Groups C and D was that the groups in question would show more gain than the length of time in treatment. For Group C it was assumed that nine months growth would have occurred without remediation during the twelve to fifteen month period of time. Therefore, nine months were added to each child's test score. In order to evaluate the effectiveness of the remedial program, the posttest achievement measure (in terms of a grade equivalent score) was compared with the level of achievement which was assumed to have been attained in the absence of remediation (pretest score plus the average number of months of remedial help). The t-test for correlated samples was the statistical procedure used to make this comparison in each subject area for each group.

The null hypothesis tested in each comparison stated that there would be no difference between the assumed level of achievement following remediation and the measured level of achievement. A 1-tail t-test was used.

Table XXV summarizes the data for Group C showing the results of the t-test for each area of achievement: Reading Comprehension, Reading Vocabulary, Arithmetic Computation, Arithmetic Reasoning, Spelling, and Written Language. Significant differences between group means were found in the data for Reading Comprehension, Reading Vocabulary, and Arithmetic Computation. No significant differences were found in group means for Arithmetic Reasoning, Spelling, or Written Language.

TABLE XXV

DATA RELATED TO ACHIEVEMENT GAINS FOR GROUP C

Variable	N	Mean Pretest + 9 mos.	Mean Post-test	Difference	t*	p
Read. Comp.	43	2.83	3.23	.40	2.79	$<.01$
Read. Vocab.	28	3.11	3.61	.50	2.72	$<.01$
Arith. Comp.	12	3.42	3.95	.53	2.60	$<.025$
Arith. Reas.	14	3.48	3.28	-.20	----	NS
Spelling	21	3.27	3.44	.17	.80	NS
Written Lang.	16	3.25	3.36	.11	.30	NS

*1-tail test

Data suggest that remedial treatment was effective in producing significant gains in Reading Vocabulary, Reading Comprehension, and Arithmetic Computation.

Supplementary Analysis. An analysis of data was carried out to determine relationships between academic gains of children and WISC Verbal and Performance IQ scores.

First, two discrete groups were selected on the basis of WISC Verbal IQ scores: a High Verbal group (defined as children earning WISC Verbal IQ scores of 110 or above) and a Low Verbal group (defined as children earning WISC Verbal IQ scores of 95 or below). High and Low WISC Performance IQ score groups were also selected using the same criteria (110 plus and 95 and below respectively).

Table XXVI presents the mean IQ score, Reading Comprehension pretest score and posttest score for each of the four groups. Reading Comprehension scores are in grade equivalents. For the comparison of achievement in Reading Comprehension, there was no significant difference between the High and Low Verbal IQ groups on the pretest, but there was a highly significant difference between these two groups on the posttest. For the High and Low Performance IQ groups there were no significant differences between them in Reading Comprehension on both the pretest and the posttest.

TABLE XXVI

READING COMPREHENSION OF HIGH AND LOW WISC IQ CHILDREN IN GROUP C

		Reading Comp.		
WISC IQ	Mean IQ	Pre-test	Post-test	p
Verbal				
110+	115.43	2.01	3.91	$<.01$
95 & below	87.83	1.84	2.78	
Performance				
110+	115.17	2.11	3.36	NS
95 & below	88.73	1.85	3.20	

These results strongly suggest that the WISC Verbal IQ score distinguishes between those children who are likely to make large gains in Reading Comprehension following remedial help and those children who are likely to make significantly smaller gains. The data show that the High Verbal IQ group made nearly two years of growth in achievement, whereas the Low Verbal IQ group made only about one year of growth.

In contrast, the data show that the High and Low Performance IQ groups both made slightly more than one year of growth. Thus, these data strongly suggest that the WISC Performance IQ score does not distinguish between those children who are likely to make significantly different gains in Reading Comprehension achievement following remedial help.

These data appear to be very consistent with the large body of research which shows that there is a much larger correlation between WISC Verbal IQ scores and Reading Comprehension than between WISC Performance IQ scores and Reading Comprehension.

Statistical Analysis: GROUP D

Children in Group D were pretested in April, 1968 while in second grade. Remedial treatment began in September, 1968 in the third grade. Posttesting was done in May, 1969 after eight months of treatment. For group D the criterion for effective treatment was that the group would show more gain than the length of time in treatment (eight months). Eight months were added to each pretest score.

Table XVII summarizes the data for Group D showing the results of the t-test for each of the following areas of achievement: Reading Comprehension, Reading Vocabulary, and Spelling. No t-test was applied to the data for Arithmetic Computation, Arithmetic Reasoning, or Written Language because the sample sizes were much too small (three, three, and four respectively). A significant difference between group means for Vocabulary achievement scores was found. No significant differences were found between group means for Reading Comprehension or Spelling.

TABLE XVII

DATA RELATED TO ACHIEVEMENT RESULTS FOR GROUP D

Variable	N	Mean Pretest + 8 mos.	Mean Post-test	Difference	t*	p
Read. Comp.	28	2.57	2.86	.29	1.66	NS
Read. Vocab.	20	2.53	3.17	.64	2.59	$<.01$
Spelling	7	2.74	3.44	.70	1.56	NS

*1 tail test

Data suggest that remedial treatment was effective in producing significant gains in Reading Vocabulary. Gains were made in Reading Comprehension and Spelling although they were not significant.

Children Dismissed From Remedial Program

Effectiveness of treatment was evaluated in terms of the percentage of children dismissed from the LD remedial program because they were achieving reasonably close to their levels of estimated intellectual ability. The criterion for dismissal was an EQ of 90 or above.

Table XXVIII shows the percentage of LD children in Groups A, B, C, and D who were dismissed from remedial treatment with all EQ's of 90 or above.

TABLE XXVIII

PERCENTAGES OF CHILDREN DISMISSED FROM TREATMENT (ALL EDUCATIONAL QUOTIENTS OF 90 OR ABOVE)

Group	No. Pupils	Months of Remedial Treatment	Percent of Children With All EQ's 90 or Above	Additional Months Treatment for Bal. of Cases	Percent of Original No. With All EQ's 90 or Above
A	36	10	33.3%	9	37.5%
B	40	8	27.5%	7	17.2%
C	48	9	20.8%	-	---
D	32	8	31.2%	-	---
	156				

Children in Groups A and B were first posttested during the second year of the project. Those who were not dismissed from the program continued to receive remedial treatment during the last year of the project. Thus, after ten months of remediation, 33.3 per cent of the pupils in Group A were dismissed from the program. The remaining youngsters were followed through nine additional months of help, after which another 37.5 per cent of the original number of pupils in Group A were dismissed.

It should be noted that remedial teachers of children in Groups A and B had little or no special training in LD. Teachers of Groups C and D met at least minimal State of Illinois requirements as special teachers of children with LD.

The data from this study suggest that from 20 per cent to 33 per cent of the LD cases who received part-time remedial treatment for periods of eight to ten months were successfully remediated. Further, remedial treatment seemed to continue its effectiveness over a longer term for youngsters who needed further remedial assistance. In general, the cases to be successfully remediated quickly were moderate and mild LD cases. The children with severe deficits that affected achievement in many academic skills required more treatment.

There is an absence of definitive research as to what constitutes a successful rate of dismissal from LD remedial programs. It was the consensus among the professional staff and school district administrators that the rate of dismissal was very satisfactory when judged in terms of actual knowledge of the children involved and the time spent in remedial treatment.

Summary and Conclusions

1. Data from the statistical analysis of four groups of children (A, B, C, D) suggest that special educational treatment resulted in significant achievement gains for LD children with reading disability. Since 60 per cent to 90 per cent of the children in these groups were disabled in reading, we conclude that treatment was effective in the area where most remedial teaching was concentrated, and in the subject which most widely affects all of a child's academic performance.

2. Data from a supplementary analysis done with Group C suggest that the LD children who made the greatest gains from treatment for problems in reading comprehension were those with above average WISC Verbal IQ scores.

3. For Groups A and B the analysis of gains in reading made by diagnostic category (auditory problems, visual problems, auditory and visual problems) was inconclusive because of the small number of cases in each category.

4. Statistically significant achievement gains were made in written language by children in Groups A and B and in some arithmetic skills by children in Groups B and C.

5. After eight to ten months of special educational treatment, 20 per cent to 33 per cent of the LD cases in the four groups were successfully remediated. This was judged to be a satisfactory rate of remediation.

6. The results reported above should be accepted with qualification because of the absence of experimental design with control groups. These results should be verified by means of better controlled studies.

7. It is our opinion that the effectiveness of educational treatment was due in part to use of the diagnostic-teacher in testing and preparing educational prescriptions for implementation by LD teachers.

8. Data suggest that teachers with no special LD training can be utilized as LD teachers when there is a shortage of trained personnel, provided that diagnostic testing and preparation of educational prescriptions are accomplished by a highly trained person, such as, a diagnostic-teacher.

CHAPTER IV

OBJECTIVE IDENTIFICATION PROGRAM

Screen One: Group Screening Program

Procedure. Five grades of children, 2300 students, were screened during the three-year period of the project. At different times first grade, second, third, and fourth were tested. The group screening program consisted of group intelligence and achievement tests for identification of underachievers. Classroom teachers administered the Otis Quick Mental Ability Test and Stanford Achievement Tests (SAT) to all children at given grade levels. National norms were used to convert raw scores to grade levels of achievement and SAT stanines.

Criteria. The criteria for underachievement were established with some variations at different grade levels. The criteria stated that all children within given ranges of intelligence on the Otis might be expected to perform within a given range of SAT stanines. (Item 5 in the Appendix lists the criteria used for various grade levels.) In general children of above average intelligence were considered underachievers if performing below grade level. Children of average intelligence were underachieving if performing one-half year below grade level at beginning second grade or one year below grade level from third grade up.

Screen one identified an average of 13 per cent of the children in the population as suspected underachievers who required individual testing to determine whether or not a learning disability existed.

Efficiency. Table XXIX below shows the comparative efficiency of the group screening program and criteria for the grades tested. The efficiency is expressed as a percentage obtained by dividing the number of children finally classified as LD cases (after screen two) by the number of children identified in the first group screen. Efficiencies varied according to IQ ranges for each grade level.

TABLE XXIX

EFFICIENCY OF CRITERIA FOR
UNDERACHIEVEMENT IN GROUP SCREEN

Group	Time of Test Administration	Average Efficiency of IQ Based Criteria
A	End of third grade	67.41%
B	Beginning third grade	72.37%
C	End second grade	61.00%
D	Beginning second grade	60.00%
E	End first grade	48.00%*

*Efficiency unsatisfactory below 50%

The efficiency of the objective screen was found to be satisfactory (above 50 per cent) when testing was conducted from beginning second grade up.

Efficiency of the screen when testing was done at the end of first grade was not satisfactory with the criteria used. Patterns of underachievement are not always apparent and tests did not discriminate sharply among levels of achievement. Data suggest that more rigorous criteria for underachievement would have raised the efficiency to 66 per cent, a satisfactory level.

For all groups of children the efficiency of the screen could have been raised slightly without impairing effectiveness of the identification procedure by requiring children of above average intelligence to demonstrate more underachievement in order to qualify for further testing. Children with serious learning disabilities who were of above average intelligence generally were performing well below grade level.

Effectiveness of the Group Screening Program. The effectiveness of screen one in identifying potential LD cases by objective criteria was difficult to ascertain. Two checks on the effectiveness were: 1) children not isolated by screen one, but referred by teachers, who subsequently were found to have LD, and 2) children who were not isolated by the screen, but had been positively identified as LD cases by other district programs or testing outside of the district.

Table XXX shows the effectiveness of the group screening program for each grade level screened. Effectiveness is expressed as a percentage. The number of positive LD cases isolated by screen one was divided by the total number of LD children identified from all sources.

TABLE XXX

EFFECTIVENESS OF GROUP SCREEN
AT VARIOUS GRADE LEVELS

Group	Grade Level at Time of Screen	Effectiveness
A	End Grade 3	84.4%
B	Beginning Grade 3	78.0%
C	End Grade 2	69.0%
D	Beginning Grade 2	78.0%
E	End Grade 1	79.5%

The average effectiveness for all groups screened was approximately 78 per cent. Since School District 68 utilized this objective group screen and also tested selected children referred by teachers, the total identification program was estimated to be highly effective. It is recommended that a similar procedure be employed by other districts for maximum effectiveness.

The efficiency and effectiveness of the objective group screen was compared to the efficiency and effectiveness of a testing program based upon teacher nominations only. During the first year of the LD program unsophisticated classroom teachers identified only a small percentage of the children found to have LD. During the second year after considerable inservice training, second grade teachers were asked to nominate students that they thought manifested serious learning problems, had LD, or were underachieving significantly.

Table XXXI shows the comparatively efficiency and effectiveness of the teacher nomination system and the objective screening program after inservice. Teachers identified 60 per cent of the children found to have LD at the conclusion of the total testing program. The 36 per cent efficiency figure was poor. Teachers referred too many pupils to be tested by a school district in terms of professional labor and cost. Efficiency and effectiveness of a teacher nomination system would be expected to vary in different school systems with the attitudes, training, experience, and sensitivity of the teachers.

TABLE XXXI

COMPARATIVE EFFICIENCY AND EFFECTIVENESS OF TEACHER NOMINATION SYSTEM AND OBJECTIVE SCREENING PROGRAM (GROUP D PUPILS)

	Teacher Nomination System	Objective Screening Program
Efficiency	36%	60+%
Effectiveness	64%	78%

When objective screening was done at the end of first grade where achievement test scores did not adequately discriminate between levels of achievement, the nominations of informed classroom teachers were just as efficient and effective as the objective screen and criteria utilized.

Conclusions. The objective group testing program as demonstrated was efficient and effective as a screening device for the identification of underachievers who were finally identified as children with LD from second through fourth grade. It was found more efficient and more effective than the teacher-referral system of well informed classroom teachers.

Screen Two: Individual Testing

The WISC and the Bender Visuo-Motor Gestalt Test were administered individually to all children isolated by screen one and to some additional children referred by teachers. The Gates Mac Ginities Reading Tests, PSLT, and Metropolitan Achievement Tests were selectively administered to children in the skills where underachievement was suspected.

Incidence of LD. Screen two identified about 9.8 per cent of the children from a grade level as mild to severe LD cases. All had EQ's of 89 or less in one or more academic skills. Other identification criteria ruled out sensory deprivation, mental retardation, and serious primary emotional disturbance as etiological factors. Cultural deprivation was considered to be insignificant in this population.

Educational Quotient (EQ). The EQ (LQ used at Northwestern University) was found to be a useful tool in providing an objective criterion for underachievement because it took into account such factors as intelligence, physical maturation, and exposure to the curriculum at different grade levels. It was useful in comparing the progress of children because it reflected our expectations for their achievement in terms of their estimated intellectual potential.

The quotient has serious limitations when computed and applied to children who are in the first few months of second grade or below. Arithmetically, some youngsters cannot attain a quotient of 89 or less (the cut-off for underachievement) even though they demonstrate learning problems and underachievement by other criteria. In our screening program some of these young children had to be classified as LD cases with quotients of 93.

Criterion for Underachievement. The criterion for underachievement required that a child demonstrate an EQ of 89 or less in one or more skill subjects. The EQ of 89 as a cut-off point resulted in the identification of many mild underachievers. It was concluded that from second through sixth grade a cut-off of 85 was more appropriate. The criterion should, however, be very flexible. The records of students with EQ's of 86-89 should be carefully scrutinized and children that appear to have serious problems in several subjects should be considered for remedial treatment.

At the end of first grade or beginning of second grade we recommend that the following criteria be considered for use in combination with case studies and judgments of a trained LD teacher or diagnostician:

1. The child with above average intelligence is significantly underachieving if performing nine months below his expected level or below grade level.

2. The child of average intelligence is significantly underachieving if performing about three to four months below grade level.

3. The child of low average intelligence is significantly underachieving if performing five to six months below grade level.

Tests. In general, screen two as conducted in this research project, was a costly procedure requiring the talents of a psychologist and diagnostic teacher. The administration of the WISC to all children from screen one represented the largest single cost factor in the identification program. A short form of the WISC as a substitute was not satisfactory. Other intelligence tests were studied as possible substitutes and subsequently discarded.

The Otis Quick Mental Ability test, when used in screen one, was satisfactory. In screen two it would be unsatisfactory as a good indicator of intellectual potential with LD children. In this population, children of above intelligence scored much higher on the Otis than the WISC. It was found that a low Otis IQ score frequently correlated to the lowest Verbal or Performance IQ score on the WISC when there was a large discrepancy between Verbal and Performance IQ scores. The Otis did not appear to reflect the child's greatest intellectual potential, and if used in screen two, could mask a learning disability.

The Slossen Intelligence Test (SIT) was considered as a substitute for the WISC and rejected. Test scores were analyzed for a group of second grade underachievers. It was found that the SIT IQ score showed a positive and significant correlation to the WISC Verbal IQ score, but not to the Performance IQ score. The SIT seemed to be essentially a measure of verbal intelligence. As such, it has little value in a program to identify children with LD who frequently manifest wide discrepancies between verbal and performance abilities.

It was our conclusion that the WISC is at present indispensible in a LD identification program as a reliable estimate of intelligence, because it measures verbal and non-verbal skills separately, and is valuable diagnostically in pinpointing specific disabilities of LD children. The expenditure of time and money in screen two can be reduced by tightening the criteria in screen one and isolating fewer children for individual testing, rather than by eliminating the WISC.

Since most children underachieving in written language were also underachieving in other subjects, it was found that the PSLT would be most efficiently used in diagnostic testing rather than in screen two of the identification program. However, in screens one and two teacher referrals and rating scales should be scanned to pick out the rare cases of isolated dysgraphia or other written language disorders.

Summary and Conclusions

The objective identification program was found to be a relatively efficient and effective program for the identification of LD cases in the elementary school from second through fourth grade. Modifications of criteria in screens one and two were suggested to improve the efficiency of the program.

CHAPTER V

INCIDENCE AND TYPES OF ACADEMIC LEARNING DISABILITIES

Incidence of LD

Incidence. During the three-year project approximately 2300 children in School District 68 were screened. The objective identification program alone identified eight per cent of the children as LD cases as defined by criteria. The total identification program,which included testing of selected teacher referrals, produced an incidence of about 9.8%. Cases ranged from mild to severe learning disabilities. Males outnumbered females at a ratio of five to two.

We estimate,on the basis of our experience, that six to seven per cent of the population demonstrated disturbances in learning processes, as well as moderate or severe underachievement. The other LD cases demonstrated less significant underachievement. Many of these cases responded quickly to remedial treatment. It is possible that lack of motivation, minor adjustment problems, and inappropriate teaching procedures were responsible for some of these mild disabilities.

Intelligence. Table XXXII on the following page lists the number of children found within each of the WISC intelligence classifications from below normal to superior. Full Scale IQ scores were used for the classifications. Six children thought to be of normal intelligence were found to be below normal.

The distribution approximates that of a normal population; however, data are insufficient to conclude that LD children are naturally found in these proportions related to intelligence. First, the screening criteria for underachievement, which varied by intelligence ranges, may have affected the distribution. Second, we did not completely rule out the possibility that emotional, cultural, or motivational factors may be etiological factors responsible for some of the bright normal and superior LD cases. Third, since the average IQ score in School District 68 is 114, some of the youngsters with average intelligence may be

TABLE XXXII

DISTRIBUTION OF FULL SCALE WISC IQ SCORES FOR LD CASES

Group of LD Children	Below Normal IQ 79 & Below	Dull Normal IQ 80-89	Average IQ 90-109	Bright Normal IQ 110-119	Superior IQ 120 & Above	Total No. Pupils
Group A	0	2	29	12	2	45
Group B	4	5	5	7	4	25
Group C	1	3	29	10	2	45
Group D	1	2	20	6	7	36
Group E	0	3	21	14	5	43
	6	15	104	49	20	194*

*194 out of 230 LD cases were tested by school psychologist "slow learners" who found it difficult to learn at the pace set for the average child in the district.

The Full Scale IQ scores do not necessarily reflect the full potential of these children. Fifty-six of these 194 children, over twenty per cent, had significant discrepancies of fifteen or more points between WISC Verbal and Performance IQ scores. Their Full Scale scores were essentially averages of the two scores. In addition, another twenty-four per cent of the children had discrepancies of ten to fourteen IQ points.

It is of interest to note in Table XXXIII that among the children with fifteen point discrepancies between WISC Verbal and Performance IQ scores, more children had higher Verbal IQ scores than Performance IQ scores.

TABLE XXXIII

CHILDREN WITH DISCREPANCIES BETWEEN WISC IQ SCORES

WISC Discrepancies of 10-14 IQ Points		
Number with Higher Verbal Scores	25	
Number with Higher Performance Scores	21	
	TOTAL	46
WISC Discrepancies of 15 or More IQ Points		
Number with Higher Verbal Scores	35	
Number with Higher Performance Scores	21	
	TOTAL	56
		102*

*102 out of 194 tested by project psychologist

Academic Subjects of Underachievement

Figure 2 on the following page illustrates the percentage of LD children from the 230 LD cases that were significantly underachieving in each of the four major academic skills. Eighty-three per cent (83%) of the LD

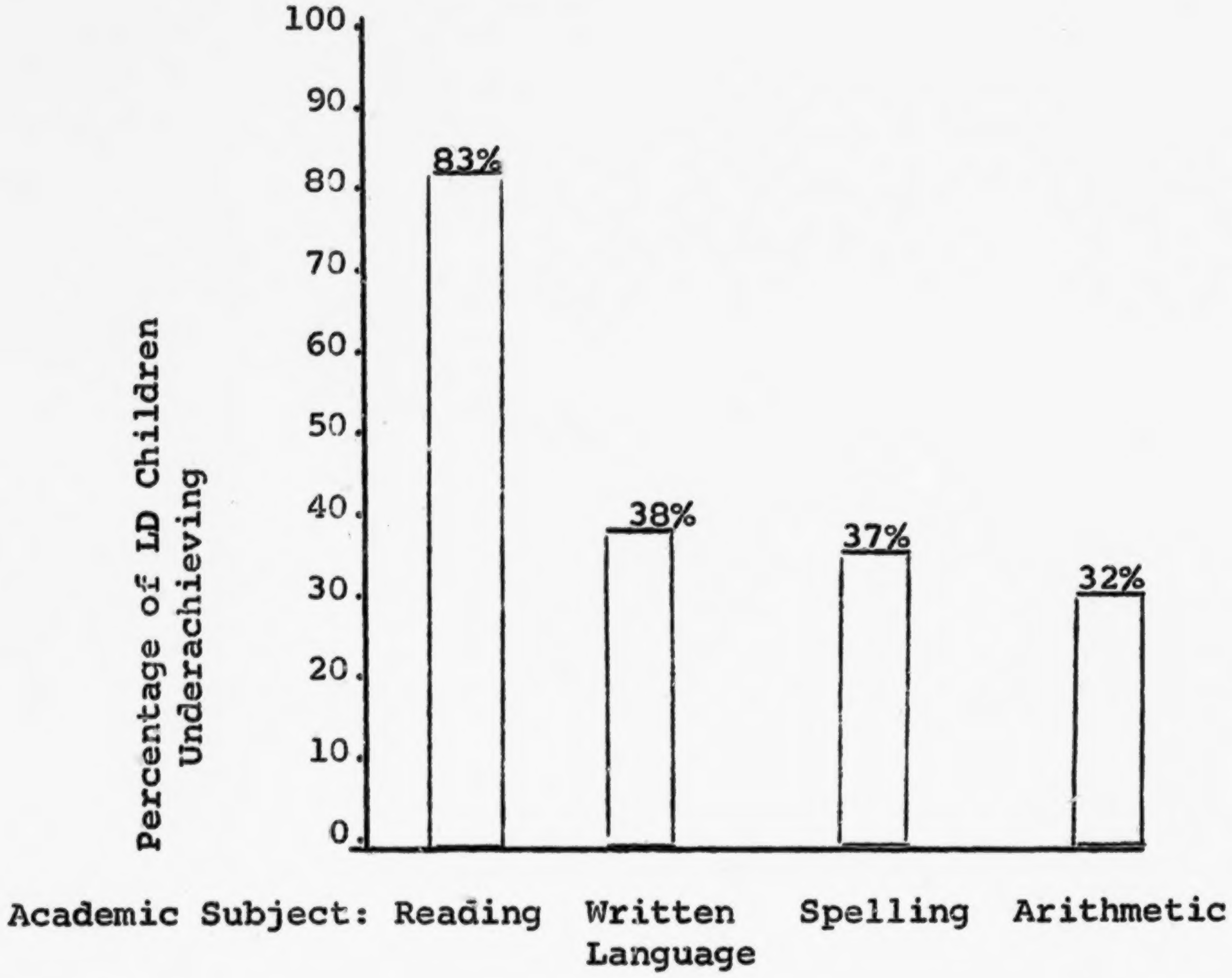

FIGURE 2

PERCENTAGE OF LD CHILDREN UNDERACHIEVING IN ACADEMIC SKILLS children were underachieving in reading. Most of these youngsters were also underachieving in one or more other skills, especially spelling or written language. Twenty-one per cent (21%) of the LD children were underachieving significantly only in reading. Many of these had problems in comprehension rather than in word attack skills.

Figure 3 shows the incidence of LD in each subject of underachievement for children from each grade level screened. The percentage of children underachieving in reading and spelling declined from second to fourth grades, while the percentage of children underachieving in written language and arithmetic rose. In first and second grade major curricular emphasis is placed upon development of reading, oral language, and the motor-mechanical skills of writing. In third and fourth grade proportionately more time is devoted to arithmetic, written language, social studies, and science. Hence the underachievement or disability of children in arithmetic or written language does not become apparent in many cases until the intermediate grades. The change in percentages may be due to general curricular practices in the United States which are reflected in the construction of achievement tests.

The number of LD children underachieving in one, two, three, and four subjects was tallied. More than 59 per cent of the children were underachieving in two or more subjects, more than 30 per cent in three or more subjects, 8 per cent in four subjects, and 40 per cent in one subject only. Of the last group, one-third were underachieving in reading. Although there were 230 cases of LD, there were actually more than 452 academic subjects of disability in this group of children. The average child was disabled in two academic subjects.

Conclusions and Implications for Administration of LD Programs

This project identified approximately seven per cent of the children screened as having moderate to severe learning disabilities and more than two per cent with mild disabilities. The high incidence of LD points to the

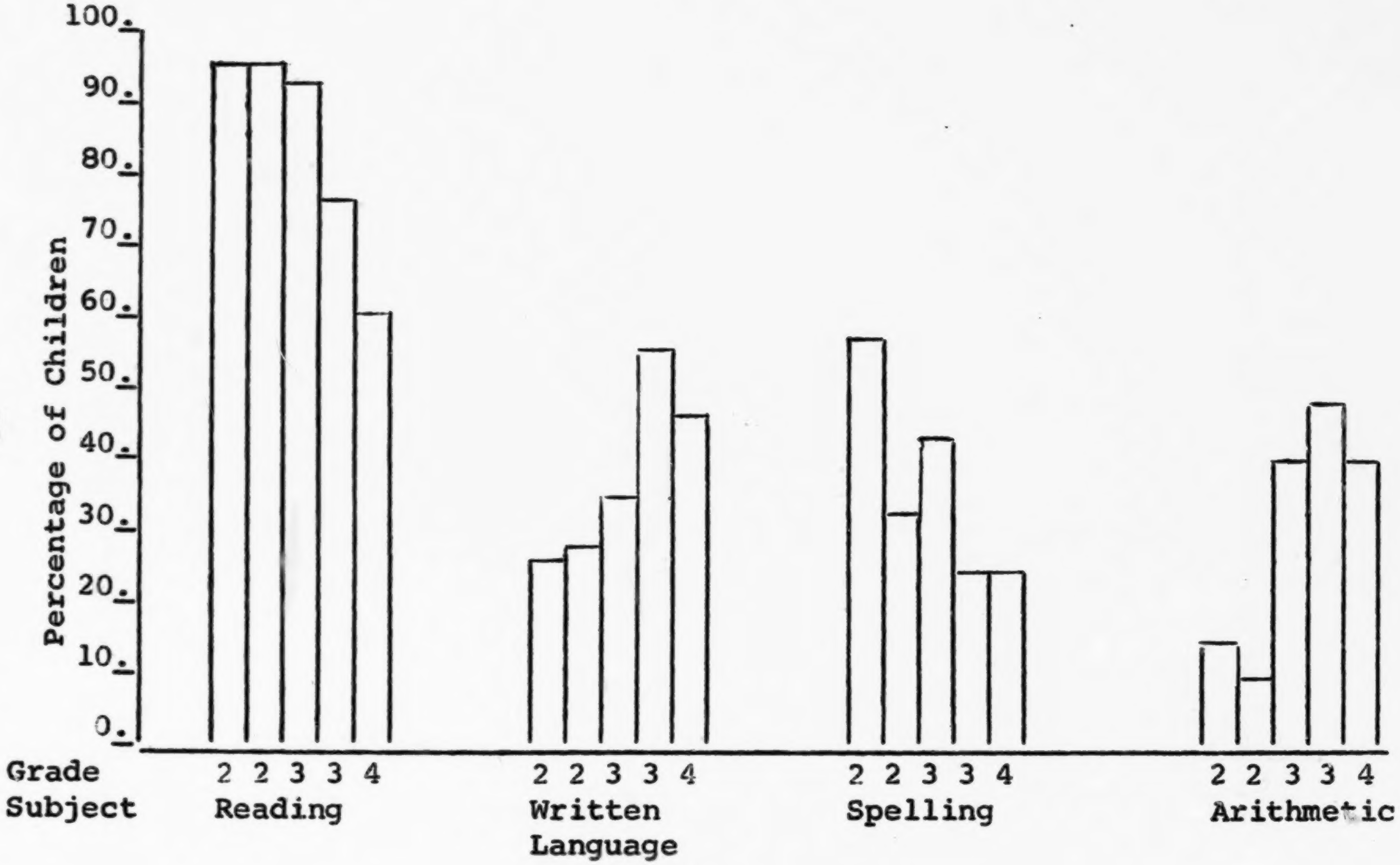

FIGURE 3

PERCENTAGE OF 230 LD CHILDREN AT EACH GRADE LEVEL UNDERACHIEVING IN ACADEMIC SUBJECTS critical need for comprehensive school programs for identification and remediation of children with LD. The need for early identification and research in this area is imperative for prevention of academic underachievement and emotional and social maladjustment.

The high ratio of males to females among LD cases in this study is in agreement with the incidence widely reported in the literature. Many educators today feel that school programs are geared more to the developmental needs of girls than of boys. If school expectations were changed in the primary grades, fewer males might become serious underachievers and behavior problems. Some of the disturbances in learning processes of males may be created or accentuated by current school practices. School personnel should be particularly alert to early signs of learning difficulty among boys.

The finding that 83 per cent of the LD children are underachieving in reading suggests the need for a critical re-examination of typical reading programs in primary grades. Current debates regarding the superiority of one reading method or another are of little consequence when we consider that the majority of children in the schools seem to learn by any of the commonly used methods. The others require different teaching procedures.

Our knowledge that all children do not learn equally well through the same sensory modalities, particularly children with LD, should guide us in development of truly individualized reading programs which are based upon knowledge of the intellectual and sensory assets and disabilities of each child. With underachievers and LD children the question is not, "Do we use a sight-word or phonic method?" The question is, "How will this child learn most successfully in terms of his own unique abilities?"

Any child manifesting unusual learning difficulties in language or reading should be tested immediately, preferably in kindergarten or first grade. A diagnosis of the problems, disabilities and assets should lead to an individualized classroom reading procedure for the child. The most intact sensory modality will suggest the best initial approach for teaching reading. Often any one of several methods may be satisfactory for teaching if it maximizes on the child's strongest sensory modality for learning.

For example, a child with a severe visual memory disability and good auditory learning abilities cannot experience early success in reading if taught initially by whole word methods utilizing many non-phonetic words. He may be expected to learn more successfully by a method stressing auditory skills and phonic regularity. The teacher could use any one or combination of phonic or linguistic reading methods. As phonic decoding skills develop and the child experiences success, whole words and non-phonetic words may be introduced.

The high incidence of LD and reading disability further suggests the need for inservice education programs for teachers and school administrators in the area of learning disability and in diagnostic teaching for classroom teachers. In recent years teachers' colleges have stressed the principle of individualizing the curriculum to meet the needs of each child, but they have failed to provide teachers with diagnostic tools. Current research in individual differences in learning has not yet spread to these institutions. In our experience, classroom teachers are eager to acquire this information.

With a knowledge of the approximate incidence of LD, a school district with a similar population may estimate the number of LD children for whom remediation may be required. The administrator, using the reported data on subjects of disability and the percentage of LD cases underachieving in one or more subjects, can estimate the number of remedial periods or hours that will be needed. He can estimate the number of LD teachers to be employed and later plan their caseloads, based not only upon the number of LD pupils, but also upon the number of remedial hours required to service these pupils. The administrator can plan to order materials from the data. Because of the high incidence of reading disability and the different approaches to teaching reading which must be used for meeting individual needs, special emphasis should be placed upon selection of reading materials. It is hoped that estimations and careful planning based upon our experience will aid other schools in realistic budgeting and development of feasible LD programs.

CHAPTER VI

COST ANALYSIS

Cost

A systems analysis was completed for the LD children in Group A, the first group to be identified and remediated. The children were identified in fourth grade. There were 470 children at the grade level during screen one. Screen two isolated 45 children, more than 9 per cent as having mild to severe LD.

The overwhelming amount of the program's budget, 95 per cent, was allocated for personnel costs; the balance was allocated for educational materials. The analysis dealt with labor cost only for the services of two diagnostic-teachers, psychologist, LD remedial teachers, one and one-half clerks, and the project director or administrator. In the case of the director, only the time required for direct identification or remediation of a youngster was included in cost analysis. Planning, coordination, ordering materials, inservice teaching, and research activities were not considered.

Cost was analyzed in terms of actual man hours of input expended to identify an LD child in Group A and provide one school year (ten months) of remediation. The cost of the ongoing regular school program was not included. Man hour inputs were computed for each phase of the program beginning with screen one. The cost of the entire program was divided among the 45 students finally identified as LD cases. Items 6 and 7 in the Appendix show the salaries of staff members and the time and money inputs of workers in the identification, diagnostic, and remediation phases of the program.

In the identification phase of the program screen one required very little special time. The Stanford Achievement Test (SAT) was administered by classroom teachers as a part of the regular district testing program. Its cost was not specific to the project. The Otis Quick Mental Ability Test was given by classroom teachers for the project and scored by clerks. The teachers' time was not included in analysis. Clerks compiled a screening list of 55 suspected underachievers based upon the SAT and Otis test results and criteria for underachievement. Twenty children referred by teachers were added to the list.

Seventy-five children entered screen two. Screen two required much greater professional effort than screen one. The time involved in administration of the WISC by the psychologist represented the largest input of man hours. Diagnostic-teachers administered achievement tests which were primarily scored by clerks. However, the diagnostic-teachers had to score the Picture Story Language Test, a procedure which was very time consuming. They also studied and processed teacher referrals and the information received from other school personnel regarding the children in screen two. Diagnostic-teachers computed educational quotients in each subject of suspected underachievement for each child in this screen and applied the criteria for identification of LD children. Screen two took about two months time.

The identification phase of the program, screens one and two, cost approximately $68 per child when man-hours of input were translated to dollars. It took about four months of time to complete the entire identification procedure with two diagnostic-teachers and a psychologist who worked for at least two months full-time while screen two was under way.

In the diagnostic phase of the program, 45 LD children were tested intensively by the diagnostic-teachers. Testing and preparation of educational prescriptions represented the largest input of hours. Some time was also spent in contacts and staffings with special personnel and classroom teachers. This phase of the program cost about $55 per child and took two months time.

In the remedial phase of the program the LD remedial teacher contributed the largest labor input. Diagnostic-teachers were involved in supervision and in-service training. The cost of remediation averaged $351 per pupil per school year (ten months) when teachers had approximately 25 pupils per caseload. Actually there was a great pupil variation in cost according to the number of hours of remediation individuals required.

Table XXXIV summarizes the per pupil labor cost for various phases of the program. The cost of identification and diagnosis was $123. These phases of the program occurred only initially with ongoing reevaluation occurring in the remedial program. The remedial phase of the program for ten months, which cost $351, continued for 25 of 45 students who were still underachieving at the end of the remedial period.

TABLE XXXIV

LABOR COSTS PER PUPIL FOR LD PROGRAM BASED ON MAN HOURS OF INPUT

Phase of Program	Group A Per Pupil Cost (45 Pupils)
Identification Screens one and two	$ 68.
Diagnosis and Educational Prescription	55.
Remediation, 10 months (one school year)	351.
Labor Cost	$474.

It should be noted that the $474 labor cost per pupil was based on manhours of input and did not represent the entire cost of the program. Most staff members, except the psychologist, were salaried on a full time basis rather than an hourly basis. They spent more time than the computed input hours in the employ of the school district at additional cost. Further, there was some "slippage" of time in the live school situation. All of the hours in the work day could not be clearly accounted for under the categories used in this study. In some instances the estimates of input may not have been accurate. The cost of materials and depreciation were not included in the $474.

Cost Product Relationship

Educational products are not concrete objects which can be objectively and quantitatively evaluated. The products of the learning disabilities program were its educational objectives:

1. Identification of LD children.

2. Effective educational treatment of these children to raise their achievement to a level commensurate with intellectual potential.

3. Fulfillment of the obligation to educate the LD children for whom traditional teaching procedures failed.

4. Improvement of mental health of pupils.

5. Establishment of a program to meet legally mandatory obligations to provide special education for LD children.

Our data and experience suggest that the educational objectives were met. The cost of labor for attaining the objectives was $474 per pupil over a period of approximately one and one-half years. At the end of a ten month remedial period one-third of the LD pupils were achieving at their estimated ability levels and the other children had made significant gains in achievement. In addition, a comprehensive LD project was established and an efficient and effective screening program developed.

There were several by-products of the program. The special abilities of many LD pupils were uncovered. Several retarded youngsters were identified. Individual intelligence data were gathered for many students who were not found eligible for LD tutorial service. The regular classroom teachers had a little more time to devote to classes because LD pupils were attending tutoring sessions, and distracting pupils were away for periods of time. Teachers became aware of individual learning modes and the problems of LD pupils. There may also have been some savings in the cost of retention. Some pupils might have been retained if they had not received special treatment.

It would be desirable to measure the units of achievement gain (output) against the cost of input. However, this cannot be done accurately or without distortion. We do not yet know how the rate of learning is affected by the type and severity of various learning disabilities. For some youngsters the maintenance of the current rate of learning may represent output because the rate would have deteriorated without remediation. Further, the achievement gain may be affected by the general tendency of regression toward the mean. When the achievement gain can be more clearly circumscribed, it will be possible to relate system input to output more accurately.

Each school district must determine for itself whether or not the output of an LD program is worth the cost when output is defined in terms of general educational objectives. The cost of special education is always high. The value of a program must be measured in humane terms as well as in cost-product relationships.

The citizens of a school district are the ones who must decide the priorities for educational services. Ultimately, their values will prevail. It is our current philosophy that the schools must help each child to learn and to develop his abilities to a optimum level. This study and many others dealing with handicapped children clearly show that the handicapped can learn and become useful citizens. It is the obligation of the schools to meet the educational needs of our children with learning disabilities.

CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS

1. This project has demonstrated a viable comprehensive program for the identification and treatment of children with LD in the public schools. The program may be modified to meet the personnel and financial limitations of any given school system. The effectiveness of the program will depend upon realistic goals, careful scheduling of activities to meet goals, efficient use of the talents of the professional staff, high standards for diagnosis and teaching, and continuous evaluation of all phases of the program - especially educational treatment.

2. An objective-type screening program for the systematic identification of children with LD in the schools was developed. The screening program utilizes intelligence and achievement test data and defines learning disability in educational terms: significant academic underachievement of a child with normal or superior intelligence in the absence of sensory impairment, primary emotional disturbance, severe motor dysfunction and cultural deprivation.

Data suggest that the screening program is relatively efficient and effective for children from second through fourth grade in middle class and upper middle class socio-economic communities. (It may be used for identification of children with LD in culturally deprived areas with adjustments in criteria.) The present screening program is not recommended for use below second grade level. Further research is indicated to identify those characteristics of kindergarten and first grade children which identify the child with LD or predict underachievement in succeeding school years.

3. This study evaluated the effectiveness of educational treatment which involved the adaptation of clinical teaching procedures to service large numbers of children with LD in school systems. The evaluation was based upon statistical analysis of the academic gains of children who received treatment and upon the number of cases judged to be successfully remediated and dismissed from

the remedial program. LD teachers worked with caseloads of about 22 youngsters per week. The children received special help two to five times per week in small groups for periods averaging forty-five minutes in length. The degree of disability within a caseload varied from very mild to severe.

Data suggest that educational treatment was effective in the area of reading which constitutes the major subject of underachievement for 60 to 95 per cent of the children with LD. The importance of reading to the entire educational progress of a child is obvious. In three of the four groups of children tested, gains in other language skills and arithmetic were made but were not statistically significant. This study suggests the need for further research in the area of teaching quantitative concepts and arithmetic skills to LD children. There is also need for verification of results reported by studies utilizing control groups.

We conclude from our experience that intensive diagnostic testing, preparation of individual educational prescriptions and ongoing evaluation of each child's problems and progress were all factors contributing to effective educational treatment by special teachers. To the school district initiating a similar program we recommend careful attention to the grouping of children by similar types of deficiencies, similar achievement levels, and behavior. Further, if one teacher's caseload is to contain only moderate and severe LD children, the size of the caseload should be about 15 children.

4. The project has demonstrated that a school district can temporarily overcome the shortage of trained LD personnel and still provide an effective program for the children. We have field tested the concept of the diagnostic-teacher. Our experience suggests that the diagnostic-teacher can successfully bridge the gap between identification and treatment of children with LD. The talents of one diagnostic-teacher can be utilized in planning a screening program, in diagnosis, in preparation of educational prescriptions, and in inservice education. A school

district may employ interested and experienced classroom teachers as special remedial teachers. These teachers can teach effectively with the prescriptions of the diagnostic-teacher and learn from them via inservice programs. A school district should simultaneously encourage formal training of these teachers by such procedures as tuition reimbursement and salary increments for additional academic training.

APPENDIX

APPENDIX

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ITEM 1

SKOKIE SCHOOL DISTRICT 68

PUPIL BEHAVIOR CHECKLIST

NAME__________________________ DATE______ PRESENT GRADE______

RATER'S NAME__________________ SCHOOL__________________________

Place a check mark after each statement that, in your opinion, applies to this student.

GENERAL BEHAVIOR

Hyperactive: short attention span ( )

Excessive daydreaming ( )

Responds inappropriately to class discussions or social situations. ( )

Unable to wait his turn to speak ( )

Unable to organize work ( )

Does not follow through on either academic or non-academic assignments. ( )

Does not relate well to classmates ( )

Slow to respond: needs time to mull over a question ( )

MOTOR BEHAVIOR

Awkward: may bump into things, trip over own feet, fail to imitate others in games. ( )

Has difficulty manipulating pencils, (poor grasp or impropper pressure), scissors, papers. ( )

Has difficulty copying letters or designs. ( )

Poor handwriting: spacing or letter formation. ( )

ORIENTATION

Poor directional or spatial orientation: trouble finding way around building, reading maps. ( )

Difficulty with concepts of quantity, measurement, size, distance, or time, e.g. more, less, seasons, telling time, etc. ( )

(General Behavior - continued)

Over-reacts emotionally to unanticipated changes in routine, such as parties, trips, or emergency situations. ( )

Inconsistent behavior pattern ( )

Seems brighter ( ) or duller ( ) than indicated by test scores

MEMORY

Trouble with rote memory tasks such as number facts, addresses, etc. ( )

Trouble recalling specific instructions or general information from class discussions. ( )

Problem with recalling incidents in correct sequence. ( )

Is unable, at times, to recall words he wants to use. ( )

SPOKEN AND WRITTEN LANGUAGE

Difficulty understanding teacher's explanations or instructions. ( )

Difficulty understanding arithmetic reasoning problems. ( )

Poor spoken language: difficulty expressing ideas or stories; bad grammar. ( )

Trouble with oral reading. ( )

Difficulty with phonics or word attack. ( )

Difficulty with reading comprehension. ( )

Has trouble expressing ideas in writing. ( )

Makes too many spelling errors in written work. ( )

(Spoken and Written Language - continued)

Reverses direction of letters or order of letters
   in reading ( )
   in writing ( )

* * * * * * * *

Child has unusual learning problems. ( )

Child is underachieving. ( )

COMMENTS:

ITEM 2

INSERVICE EDUCATION RESOURCES

I. Basic Text: Learning Disabilities by Doris Johnson and Helmer Myklebust. New York: Grune and Stratton, 1967.

II. Films:

1. Bright Boy, Bad Scholar
2. Why Billy Couldn't Learn
3. The Human Brain
4. The Child Few People Understand
5. The Dyslexic Child

Information on films is available from the California Association for Neurologically Handicapped Children, 309 North Duane, San Gabriel, California.

III. Books:

Cruickshank, William. A Teaching Method for Brain-Injured and Hyperactive Children. New York, N.Y.: Syracuse University Press, 1967.

______________________. The Brain-Injured Child in Home, School, and Community. New York, N.Y.: Syracuse University Press, 1967.

______________________. The Teacher of Brain-Injured Children. New York, N.Y.: Syracuse University Press, 1966.

Hellmuth, Jerome (ed.). Educational Therapy, Vol. I, Seattle, Wash.: Special Child Publications, 1966.

______________________. Learning Disorders, Vols. I and II. Seattle, Wash.: Special Child Publications, 1965.

DeHirsch, Katrina, et al. Predicting Reading Disability. New York, N.Y.: Harper and Row, 1966.

Money, John (ed.). The Disabled Reader. Baltimore, Md.: Johns Hopkins Press, 1966.

Myklebust, Helmer. The Development and Disorders of Written Language, Vol. I. New York, N.Y.: Grune and Stratton, 1965.

Strauss, Alfred and Laura Lehtinen. The Brain-Injured Child, Vol. I. New York, N.Y.: Grune and Stratton, 1964.

________________, and Newell Kephart. The Brain-Injured Child, Vol. II. New York, N.Y.: Grune and Stratton, 1955.

IV. Periodicals:

Elementary English.

Elementary School Journal.

Exceptional Children. Washington, D.C.: The Council for Exceptional Children, NEA.

The Reading Teacher. Newark, Dela.: International Reading Association.

Reading Research Quarterly. Newark, Dela.: International Reading Association.

V. Pamphlets and Reprints:

Clements, Sam. Some Aspects of the Characteristics, Management, and Education of the Child with Minimal Brain Dysfunction. England, Ark.: Arkansas Association for Children with Learning Disabilities, Inc.

Kline, Carl L. "The Lost Child Who Cannot Read: A Guide for New Approaches" Medical Science (November 1966).

McCarthy, Jeanne. "How to Teach the Hard-to-Reach" Grade Teacher (June 1967).

ITEM 3

LEARNING DISABILITIES PROGRAM, SCHOOL DISTRICT 68
SKOKIE, ILLINOIS

BASIC REMEDIAL MATERIALS

A. LANGUAGE MATERIALS

1. Hegge-Kirk-Hegge, Remedial Reading Drills
George Wehr Publishing Co.
Ann Arbor, Michigan

2. Wenkart Phonetic Readers
Wenkart
4 Shady Hill Square
Cambridge, Mass. 02138

3. First Course in Phonic Reading (Helson)
4. Second Course in Phonic Reading, (Helson) Book I
5. Second Course in Phonic Reading, (Helson) Book II
Educator's Publishing Service
75 Moulton Street
Cambridge, Mass. 02138

6. Craig Phonetic Readers
Educator's Publishing Service
75 Moulton Street
Cambridge, Mass. 02138

7. Word Analysis Practice Kits, A & B, (Intermediate Level)
Harcourt & Brace
7555 Caldwell
Chicago, Ill.

8. Visual Tracking Workbooks
Ann Arbor Publishing
610 S. Forest Ave.
Ann Arbor, Michigan

9. Barnell-Loft Specific Skill Builders
Barnell-Loft
111 S. Centre Ave.
Rockville Center, N.Y. 11571

10. Language Master, headphone and Language Master Cards
Midwest Visual Products
3518 Devon Ave.
Chicago, Ill.

11. Sullivan Remedial Reading Texts, Series I & II and Soft Cover Readers
Behavioral Research Laboratories
Box 577
Palo Alto, California 94302

12. SRA Listening Skill
Science Research Association, Inc.
29 East Erie St.
Chicago, Ill. 60611

13. Dolch List Sight Words
Garrard Publishing Co.
Champaign, Ill.

14. Bloomfield-Barnhart Linguistic Readers: Let's Read
Clarence Harnhart, Inc.
Box 359
Bronxville, New York

15. McCracken-Walcutt Readers (Grades 1-4)
J. B. Lippincott Co.
Educational Publishing Div.
East Washington Square
Philadelphia, Pa. 19105

16. Gates Peardon Reading Exercises (4 Levels)
Teachers College Press
Columbia University
525 W. 120th St.
New York, N. Y. 10027

17. Webster New Practice Readers (A-D-E-F-G)
Webster Publishing Co.
Div. of McGraw Hill Co.
Manchester Road
Manchester, Missouri 63062

18. "Know Your World" newspaper
My Weekly Reader
Education Center
Columbus, Ohio 43216

19. Jim Forest Readers; Morgan Bay Mystery Series and Deep Sea Adventures
Harr Wagner Publishing
609 Mission St.
San Francisco, California 94105

20. Phonetic Word Wheel
Beckley-Cardy Co.
1900 N. Narragansett St.
Chicago, Ill. 60639

B. MISCELLANEOUS

1. Frostig Program for Development of Visual Perception
Follett Publishing Co.
1010 Washington Blvd.
Chicago, Ill. 60607

2. Math Slates
Aero Educational Products
St. Charles, Ill. 60174

3. Wooden Peg Boards
4. Plastic Number Lines
5. Magic Cards
6. Sequence Pictures
Beckley-Cardy Co.
1900 Narragansett St.
Chicago, Ill. 60639

7. Richmond Phonogram Pictures
8. Dominoes
9. Arithmetic Sign Dice
10. Chelsea Digit Value Cards
Teaching Aids Division
A. Daigger Co.
159 W. Kinzie St.
Chicago, Ill.

11. Webster Word Wheels

Webster Publishing Co.
Div. of McGraw Hill Co.
Manchester Road
Manchester, Missouri 63062

C. MATERIALS TO BE SHARED

1. Continental Press Ditto Masters - all grade levels - various skills

Continental Press
1451 Dundee Ave.
Elgin, Ill.

2. Milliken Ditto Masters - all grade levels - various skills

Milliken Publishing Co.
611 Olive St.
St. Louis 1, Mo.

3. Tachitrons

Lafayette Instrument Co.
P. O. Box 1279
52 By-Pass
Lafayette, Indiana

4. Tachistoscope Film Strips (Phrases-Sentences-Phonics)

Society for Visual Education, Inc.
1345 Diversey Parkway
Chicago, Ill. 60614

5. Instructional Aid Kits

Dexter & Westbrook
111 S. Centre Ave.
Rockville Centre, New York

6. Peabody Picture Vocabulary Kit

American Guidance Service, Inc.
720 Washington Ave. S. E.
Minneapolis 14, Minn.

7. Tape-recorder
   3-M Manufacturing Co.
   St. Paul 19, Minnesota

8. Miscellaneous Phonics Filmstrips

ITEM 4

SAMPLE EXERCISES FOR DEVELOPMENT OF LEARNING PROCESSES

For Auditory Discrimination:

A. The teacher reads pairs of words, some similar in sound and others identical in sound. The child is asked to tell whether or not the words in a pair are the same or different.

B. For the child who reads, a worksheet is prepared with rows of words similar in sound. The teacher reads a word, and the child circles the word he hears. For example, the teacher reads "far":

1. farm [✓ far] fort

C. The teacher reads a word in syllables. The child is asked to repeat syllables and blend them into a word.

For Auditory Memory:

A. The teacher presents a series of words auditorily. Child responds orally, or in written form, exactly as the teacher has spoken.

For example:
1. books, pencils, paper
2. pears, apples, peaches
3. key, lunch money, books

B. The teacher reads a sentence orally. The child is to remember and repeat the sentence with items in correct order.

For example:
1. Study your spelling, poems, and tables.
2. Bring me a pencil, 2 erasers, and some paper.
3. Go to the store and buy 1 dozen eggs and a quart of milk.

For Comprehension (Auditory)

A. The children are read sentences, paragraphs, or stories and are asked to retell the story in their own words or answer questions pertinent to the story.

B. Children are given specific directions to follow, such as:

"Go touch the flag and the phonograph."
or
"Touch the clock with your right hand
and place the red blocks on the paper."

For Oral Expression (Vocal Encoding)

A. The tutor asks the children how many ways they can use an object or thing, such as "How many ways can you use a tire? -- or a mirror?" The children explore all areas of possibility.

B. While observing a catalogue or group of pictures, the children are asked, "If you were firemen, what would you do with this?" The children are to list all the possible uses a fireman (or other vocation) would make of the object.

For Association (Auditory-Vocal)

A. The child is asked how two concepts or objects are alike or different, such as how are a ball and balloon alike--different? Or, how are a ship and an aircraft alike--different?

B. Three words are presented to the child and he is to name a category that all three would fit. Leaves, bark, and limbs all fit on a tree, etc.

For Visual Memory

A. A twenty-inch piece of narrow paper with the numbers 1, 2, 3, and 4 (or large X's) spaced evenly across the face is presented to the child. The tutor points out a series of numbers and the child points the proper sequence back to the tutor.

B. A series of letters (or numbers) is written on the chalkboard and observed by the child. The series is erased. The child reproduces the letters from memory.

For Development of Form Perception

A. Appropriate Frostig ditto exercises.

B. Puzzles suitable to child's ability.

C. The teacher makes a peg board design. Child duplicates design on another peg board.

ITEM 5

EXPERIMENTAL SCREEN ONE CRITERIA FOR UNDERACHIEVEMENT
(Otis Quick Mental Ability Test and Stanford Achievement Tests)

Grade at Time of Screen One Testing	Expected SAT Achievement Stanine Based Upon Otis IQ	Criterion for Underachievement	SAT Subtests Considered
A End Third Grade Spring, 1966	Children With Expectancy Stanines (ES) of 3 or less	One stanine below the expected in one or more subjects and a scatter of four or more stanines.	Word Meaning, Paragraph Meaning, Word Study Skills, Spelling, Arithmetic Computation, Arithmetic Concepts, Language.
	Children with ES of 4 and 5	Three or more stanines below expected in two subtests or four stanines below in one subtest.	
	Children with ES 6 and above	Four stanines or more below in two subtests or four in one and three in another.	
B Beginning Third Grade Fall, 1966	Children with ES 3 or less	One stanine below expected in one or more subjects.	Same
	Children with ES of 4, 5, or 6	Three stanines or more below expected in two subtests or four in one subtest.	
	Children with ES 7 or above	Four stanines or more below in two subtests	

Grade at Time of Screen One Testing	Expected SAT Achievement Stanine Based Upon Otis IQ	Criterion for Underachievement	SAT Subtests Considered
C End Second Grade, Spring, 1967	Children with ES of 1	Test every child	Same
	Children with ES 3 or 2	One stanine below expected in one or more subtests	
	Children with ES of 4, 5 or 6	Two stanines or more below expected in two subtests	
	Children with ES or 7	Three stanines or more below expected in two subtests.	
	Children with ES or 8 or 9	Four stanines or more below expected in two subtests.	
D Beginning Second Grade Fall, 1967	Children with ES of 1	List all children for testing.	Same except Language Subtest not used.
	Children with ES or 3 or 2	One stanine or more below expected in one or more subtests.	
	Children with ES or 4, 5, or 6	Two stanines or more below expected in two subtests.	
	Children with ES or 7	Three stanines or more below expected in two subtests.	
	Children with ES or 8 or 9	Four stanines or more below expected in two subtests.	

Grade at Time of Screen One Testing	Expected SAT Achievement Stanine Based Upon Otis IQ	Criterion for Underachievement	SAT Subtests Considered
E End First Grade	Children with ES of 1	Test all children.	Word Meaning, Paragraph Meaning, Vocabulary, Spelling, Word Study Skills, Arithmetic*
	Children with ES of 3 or 2	One stanine or more below expected in one subtest.	
	Children with ES or 4 or 5	One or more stanines below expected in any two subtests or in arithmetic only.	
	Children with ES or 6 or 7	Two stanines or more below expected in any two subtests or arithmetic only.	
	Children with ES or 8 or 9	Three stanines below expected in any two subtests or math only.	

*For Group E the Otis-Lennon Mental Ability Test was used. The ITA Edition of SAT was used in one elementary school building.

ITEM 6

SALARIES OF THE LEARNING DISABILITIES PROGRAM STAFF, 1966-67 SKOKIE SCHOOL DISTRICT #68

	Type of Worker	Annual Wage	Hourly Wage*
1.	Administrator	$12,000.	$6.38
2.	Diagnostic-Teacher	7,750.	5.24
3.	Remedial Teacher	6,900	4.66
4.	Psychologist**	2,229.	6.91
5.	Secretary	4,935.	2.63
6.	Clerk, ½ time	2,000.	1.83

*The hourly wage is computed on the basis of 185 eight-hour working days in the academic year for all workers except the administrator and the secretary. These workers are employed for a full year and their wages are computed on this basis.

**The psychologist is employed by the School System and is retained by the Learning Disabilities Program on an hourly basis.

ITEM 7

TIME AND MONEY INPUTS BY PHASE AND TYPE OF WORKER IN LD PROJECT

Type of Worker	Number of Man Hours	Cost
Phase I		
Identification		
1. Diagnostic-Teacher	133.0	$ 605.
2. Clerk	80.5	185.
3. Administrator	9.5	59.
4. Psychologist	324.0	2,229.
Phase II		
Diagnosis and Educational Prescription		
1. Diagnostic-Teacher	426.0	$ 2,235.
2. Classroom Teacher	6.0	27.
3. Clerk	54.0	121.
4. Remedial Teacher	15.0	70.
5. Administrator	7.5	45.
Phase III		
Remediation		
1. Diagnostic-Teacher	321.0	$ 1,682.
2. Remedial Teacher	2,890.0	13,730.
3. Administrator	62.5	397.

OE 6000 (REV. 9-66)

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
OFFICE OF EDUCATION

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IDENTIFIERS

ABSTRACT: A Chicago suburban public school with approximately 450 children per grade level demonstrated a system-wide program for identification, diagnosis, and educational treatment of children with learning disabilities in grades two through six. The program defined learning disabilities as significant underachievement when mental retardation, sensory impairment, motor dysfunction, cultural deprivation, and serious emotional disturbance were ruled out. Children were judged to underachieve when achievement measures in language or mathematics fell more than ten percent below the expected level based on age, I.Q., and grade placement. During the three-year project, a screening program was developed and employed on 2300 children. A novel remedial program was carried out for 156 children. Specialists in learning disabilities refined the screening diagnosis and developed teaching prescriptions for all students. Much of the teaching was carried out by teachers with minimal special training. The procedures developed may be especially useful to districts initiating a learning disabilities program or one which is handicapped by lack of specially trained teachers. Report contains program description, measures of student performance, tables on incidence and types of learning disabilities and suggestions for implementing a program.